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PATENT
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By: *Aurora Lowell*
Aurora Lowell

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Larry C. Frame et al.

Application No.: 10/044,484

Filed: January 11, 2002

For: METHODS AND SYSTEMS FOR
EXTRACTING RELATED
INFORMATION FROM FLAT FILES

Examiner: Debbie M. Le

Art Unit: 2167

DECLARATION PURSUANT TO
37 C.F.R. §1.131

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P.O. Box 1450
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Sir:

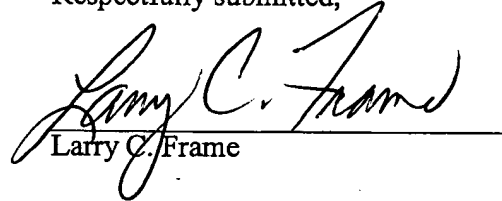
I, Larry C. Frame, declare as follows:

1. I am a co-inventor of the subject matter of the referenced patent application.
2. Prior to November 30, 2001, I participated in reducing to practice the subject matter of the above-described patent application (hereinafter "the invention"), as evidenced by Exhibit A. Exhibit A includes pages 1-3 and the last page of the source code file. The change log on the last page documents that, at least by 6/6/01, the invention had been reduced to practice.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the

like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above-referenced application or a patent issued therefrom.

Respectfully submitted,


Larry C. Frame

60607769 v1

```

/* REXX */      /* lcframe - 05/16/01 */
/#### NOTE: this version is the next step after version DVSQL4 that has ####/
/#### the initial try at AND/OR logic for processing a single SELECT ####/
/#### alias output reference. Also this includes the changes to do all ####/
/#### the WHERE record selection as a group procedure effort and the ####/
/#### associated SELECT options/reformatting will process as a procedure####/
/#### effort AFTER all WHERE selection processing has finished. ####/
/*----- DVSQL (DV's version3 of SQL for flat files) -----*/
SQL processor for inquiries involving non-DB2 files.
-----
The following are processing verbs currently available for this processor
-----
SELECT - definition of selected data to be used as output for the query
format: SELECT {DISTINCT} {sub-params,} field1, field2, etc.
Sub Parameters:
    DISTINCT - per the selected fields, make the list singular
    COUNT - number of records selected
              format: COUNT({DISTINCT} field)
    MAX - largest value for the specified field
          format: MAX(field)
    MIN - smallest value for the specified field
          format: MIN(field)
field format: file-letter.(displacement,length)
              where file-letter is the alphabetic letter associated with the
              input DDname on the FROM statement and "displacement" and
              "length" describe the location of the field in the input record.
              - or -
field format: 'literal-value'
              where literal value is any character/s that are to be inserted
              into the output record.
FROM - input DDnames and alias letter (maximum of 2 per SELECT)
format: FROM DDname1 file-letter1, DDname2 file-letter2
              where "DDname" is a DD/filename defined in the JCL of the JOB and
              "file-letter" is an UPPER-CASE alphabet letter to be used as a
              short-hand association to the file when describing field name for
              use with other verbs.
INTO - output DDname (default is SYSOUT or work file/table)
format: INTO DDname
WHERE - conditions of processing
format 1: WHERE A = B =,<>,<,<=,>,>= compare
format 2: WHERE A IN C select A values that are in list B
format 3: WHERE A NOT IN C select A values that are not in list B
format 4: WHERE A NUMERIC class tests ALPHA, INTERGER, ALPHANUMERIC
format 5: WHERE cond AND cond intersection of condition outputs
format 6: WHERE cond OR cond union of condition outputs
format 7: WHERE A BETWEEN value1 AND value2
NOTE: in the above formats, A designates an input field,
      B designates an input field or a literal value ( 'xxxxxx' ),
      C designates either a user defined table of values
      "('A','B','C','etc') " or a sub-query "(SELECT etc etc)"
ORDER BY - sorted order to save output in
format: ORDER BY field1, field2, field3, etc. where...
              fieldx is (displacement,length){ order}
              displacement - location of field in output record
              length - length of field at specified location
              order - ASC (ascending - default) or DESC (descending)
-----

```

Note: When using the NOT IN option of the WHERE verb, it is assumed that the user will not be selecting any fields from the control file for use in the output, as that would be stupid since you are looking for compare records that don't have their in the control file.

Note: This processor processes ALL logical file relations and comparisons (WHERE information) associated with an SQL level first, then does ALL SELECT record reformatting on the resulting file of information.

A WHERE comparison involving more than one file (a compare and control file) results in a compound record structure consisting of selected comparison-file records suffixed with the logically paired control-file records. This causes the DVSQ program to use enhanced field referencing when doing the final SELECT processing for each SQL level since the requested field may reside in the suffixed (extended) portion of the WHERE output record.

If complex (multi-file) compare is to be done for any SQL level, it must be the first compare in the WHERE verb for that level. This tells the processor that the rest of the comparisons of that level will involve use of a compound file structure.

Control cards are inputted via the SYSIN DD.

Passed parm information is as follows:

PNODE - The primary node to use in creating sort work data sets and other needed work files.

WKDISP - Valid values are KEEP and DELETE (<--default). This tells the processor whether to keep or delete generated work files

OUTDSN - data set name of the default output file to be automatically generated in place of specifying the INTO verb. If OUTDSN is specified, the INTO SQL verb will be ignored.

parse upper arg PNODE WKDISP OUTDSN JUNK

* Make sure a Primary NODE value was specified

if PNODE = '' | PNODE = 'HELP' then
do

say ' '

say ' '

say ' Format of //SYSTSIN DD * control card is as follows: '

say ' " %DVSQ PNODE WKDISP OUTDSN " '

say ' where PNODE is the primary node to catalog all work areas and
say ' data sets (mandatory field) '

say ' WKDISP is the disposition of all work data sets used and
say ' created in the DVSQ process. Valid values are '

say ' *, KEEP, DELETE. KEEP causes all work data sets to
say ' be kept after processing is complete. DELETE or * '

say ' (the defaults) cause all work data sets to be '

say ' deleted (cleaned up) after processing is complete. '

say ' OUTDSN is the name of the output data set to be used to '

say ' store the DVSQ output. This option overrides any '

say ' use of the INTO verb in the SQL requests. '

say ' '

say ' '

say ' ++ Options and Format of DVSQ Statements ++ '

say ' '

call SELECT_FORMAT

call FROM_FORMAT

call INTO_FORMAT

call WHERE_FORMAT

call ORDER_BY_FORMAT

exit 8

end

```

/*-----*\
| * Verify inputted WKDISK parm |
\*-----*/
select
  when WKDISP = '*'      then WKDISP = 'DELETE'    /* use default */
  when WKDISP = 'DELETE' then nop
  when WKDISP = 'KEEP'   then nop
  when WKDISP = ''       then WKDISP = 'DELETE'    /* use default */
  otherwise
    do
      say '*****'
      say '** ERROR **'
      say '*****'
      say '  The inputted work data set disposition PARM value',
        "'WKDISP'" is invalid.'
      say '  Valid values are:'
      say '      "DELETE" - delete all work data sets generated'
      say '      "KEEP"   - keep all generated work data set'
      say '      "*"      - use the DELETE default'
      return 8
    end
end

say ' '
say '---- Specified DVSQ command line PARMS ----'
say '      PNODE = 'PNODE
say '      WKDISP = 'WKDISP
if OUTDSN = '' then
  say '      OUTDSN = N/A'
else
  say '      OUTDSN = 'OUTDSN
say ' '

/*-----*\
| * Put the user inputted SQL control cards onto an internal SYSIN. table |
\*-----*/
x = outtrap('DUMMY.')
"alloc f(SYSIN)"
x = outtrap('OFF')
"execio * disk SYSIN (stem SYSIN. finis"
REXX_RC = RC
"free f(SYSIN)"
if REXX_RC > 0 then
  do
    say ' Error reading SYSIN, execio RC = 'REXX_RC
    return 16
  end
end

/*-----*\
| * do compiler stuff to verify format and content of control cards |
| * and generate a stack of processing tokens |
\*-----*/
QUOT = ''
DDS = 0 /* init general query DD list counter */
OUT#DD = 'SQLOUT' /* set output default, in case there is no INTO verb */
OUT#DSN = '' /* initialize DSN relative to INTO verb */
SORT#CARD = '' /* initialize area to store parsed ORDER BY information */
I = 1 /* set current query level */
IMAX = 1 /* set current highest query level */
call INIT_NEW_QUERY_LEVEL_FIELDS

```

```

"alloc f(SYSOUT) DUMMY"
/* "call 'FDR.SYNCR36.LINKLIB(SYNCSORT)'" */
address ATTCHMVS "SORT"
/* use LRECL of first record */
if RC = 0 then
  do
    x = listdsi("'"LRECLCHK'"")
    LRECL = SYSLRECL
  end
else
  say '***WARNING** could not obtain LRECL info for ',
    'the data set 'LRECL_DSN
  "free f(SORTIN SORTOUT SYSIN SYSOUT)"
end
else
  do
    say '***ERROR** Problem obtaining LRECL info for 'LRECL_DSN
    say '    Cannot process without it. Processing terminated.'
    exit
  end
return

```

```

/***** C H A N G E   L O G *****/
/** DATE      PGMR      DESCRIPTION */
/**-----*/
/* [REDACTED] lcframe NOT IN added to WHERE verb options. */
/* [REDACTED] lcframe Cleanup of code, use full DD alias'.' in WHERE_TYPE. */
/* [REDACTED] lcframe Addition of WHERE IN (table list, etc.) option. */
/* [REDACTED] lcframe Upgrade product to handle VSAM and TAPE inputs and be */
/* generally more generic in processing. */
/* [REDACTED] lcframe Genericise generation of INREC and OUTREC ctlcards. */
/* [REDACTED] lcframe Add option to specify by final output data set by */
/* input parm (using internal processing defaults) or specific INTO DD. */
/* [REDACTED] lcframe Fix a problem with the unit specification associated */
/* with the compare file parameters. */
/* [REDACTED] lcframe Complete adding the work data set DELETE/KEEP option */
/* [REDACTED] lcframe Invoke SYNCSORT via ATTCHMVS to be able to more */
/* generally locate it on other JES complexes. */
/* [REDACTED] lcframe Make sure the output file is at least empty. No null */
/* outputs allowed. */
/* 06/06/01 lcframe Upgrade changes to allow for use of MIN, MAX, and */
/* COUNT functions as well as AND/OR logic in the WHERE verb. */
/* 2004/01/15 lcframe SORTWKxx files are no longer needed. SYNCSORT now */
/* dynamically monitors and allocates SORTWKxxs as needed. */
/*****

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Larry C. Frame et al.
Application No.: 10/044,484
Page 2

PATENT

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Respectfully submitted,


Mark Rowe

60608073 v1


```

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/#### the initial try at AND/OR logic for processing a single SELECT ####/
/#### alias output reference. Also this includes the changes to do all ####/
/#### the WHERE record selection as a group procedure effort and the ####/
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/#### effort AFTER all WHERE selection processing has finished. ####/
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SQL processor for inquiries involving non-DB2 files.

```

The following are processing verbs currently available for this processor

SELECT - definition of selected data to be used as output for the query
format: SELECT {DISTINCT} {sub-params,} field1, field2, etc.

Sub Parameters:

DISTINCT - per the selected fields, make the list singular

COUNT - number of records selected

format: COUNT({DISTINCT} field)

MAX - largest value for the specified field

format: MAX(field)

MIN - smallest value for the specified field

format: MIN(field)

field format: file-letter.(displacement,length)

where file-letter is the alphabetic letter associated with the
input DDname on the FROM statement and "displacement" and

"length" describe the location of the field in the input record.

- or -

field format: 'literal-value'

where literal value is any character/s that are to be inserted
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format: FROM DDname1 file-letter1, DDname2 file-letter2

where "DDname" is a DD/filename defined in the JCL of the JOB and
"file-letter" is an UPPER-CASE alphabet letter to be used as a
short-hand association to the file when describing field name for
use with other verbs.

INTO - output DDname (default is SYSOUT or work file/table)

format: INTO DDname

WHERE - conditions of processing

format 1: WHERE A = B =,<>,<,<=,>,>= compare

format 2: WHERE A IN C select A values that are in list B

format 3: WHERE A NOT IN C select A values that are not in list B

format 4: WHERE A NUMERIC class tests ALPHA, INTERGER, ALPHANUMERIC

format 5: WHERE cond AND cond intersection of condition outputs

format 6: WHERE cond OR cond union of condition outputs

format 7: WHERE A BETWEEN value1 AND value2

NOTE: in the above formats, A designates an input field,

B designates an input field or a literal value ('xxxxxx'),

C designates either a user defined table of values

"('A','B','C','etc')" or a sub-query "(SELECT etc etc)"

ORDER BY - sorted order to save output in

format: ORDER BY field1, field2, field3, etc. where...

fieldx is (displacement,length){ order}

displacement - location of field in output record

length - length of field at specified location

order - ASC (ascending - default) or DESC (descending)

Note: When using the NOT IN option of the WHERE verb, it is assumed that
the user will not be selecting any fields from the control file for use
in the output, as that would be stupid since you are looking for compare
records that don't have their key in the control file.

Note: This processor processes ALL logical file relations and comparisons (WHERE information) associated with an SQL level first, then does ALL SELECT record reformatting on the resulting file of information.

A WHERE comparison involving more than one file (a compare and control file) results in a compound record structure consisting of selected comparison-file records suffixed with the logically paired control-file records. This causes the DVSQ program to use enhanced field referencing when doing the final SELECT processing for each SQL level since the requested field may reside in the suffixed (extended) portion of the WHERE output record.

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Control cards are inputted via the SYSIN DD.

Passed parm information is as follows:

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OUTDSN - data set name of the default output file to be automatically generated in place of specifying the INTO verb. If OUTDSN is specified, the INTO SQL verb will be ignored.

parse upper arg PNODE WKDISP OUTDSN JUNK

* Make sure a Primary NODE value was specified

if PNODE = '' | PNODE = 'HELP' then
do

say ' '
say ' '
say ' Format of //SYSTSIN DD * control card is as follows:'
say ' "%DVSQ PNODE WKDISP OUTDSN "'
say ' where PNODE is the primary node to catalog all work areas and'
say ' data sets (mandatory field)'
say ' WKDISP is the disposition of all work data sets used and'
say ' created in the DVSQ process. Valid values are '
say ' *, KEEP, DELETE. KEEP causes all work data sets to'
say ' be kept after processing is complete. DELETE or '*'
say ' (the defaults) cause all work data sets to be '
say ' deleted (cleaned up) after processing is complete.'
say ' OUTDSN is the name of the output data set to be used to'
say ' store the DVSQ output. This option overrides any'
say ' use of the INTO verb in the SQL requests.'

say ' ++ Options and Format of DVSQ Statements ++'

say ' '
call SELECT_FORMAT
call FROM_FORMAT
call INTO_FORMAT
call WHERE_FORMAT
call ORDER_BY_FORMAT
exit 8

end

```

/*-----*\
|* Verify inputted WKDISK parm |
\*-----*/
select
  when WKDISP = '*'      then WKDISP = 'DELETE' /* use default */
  when WKDISP = 'DELETE' then nop
  when WKDISP = 'KEEP'   then nop
  when WKDISP = ''       then WKDISP = 'DELETE' /* use default */
  otherwise
    do
      say '*****'
      say '** ERROR **'
      say '*****'
      say ' The inputted work data set disposition PARM value',
        "'WKDISP'" is invalid.'
      say ' Valid values are:'
      say '      "DELETE" - delete all work data sets generated'
      say '      "KEEP"   - keep all generated work data set'
      say '      "*"     - use the DELETE default'
      return 8
    end
end

say ' '
say '---- Specified DVSQl command line PARMS ----'
say '      PNODE = 'PNODE
say '      WKDISP = 'WKDISP
if OUTDSN = '' then
  say '      OUTDSN = N/A'
else
  say '      OUTDSN = 'OUTDSN
say ' '

/*-----*\
|* Put the user inputted SQL control cards onto an internal SYSIN. table |
\*-----*/
x = outtrap('DUMMY.')
"alloc f(SYSIN)"
x = outtrap('OFF')
"execio * disk SYSIN (stem SYSIN. finis"
REXX_RC = RC
"free f(SYSIN)"
if REXX_RC > 0 then
  do
    say ' Error reading SYSIN, execio RC = 'REXX_RC
    return 16
  end
end

/*-----*\
|* do compiler stuff to verify format and content of control cards |
|* and generate a stack of processing tokens |
\*-----*/
QUOT = ""
DDS = 0 /* init general query DD list counter */
OUT#DD = 'SQLOUT' /* set output default, in case there is no INTO verb */
OUT#DSN = '' /* initialize DSN relative to INTO verb */
SORT#CARD = '' /* initialize area to store parsed ORDER BY information */
I = 1 /* set current query level */
IMAX = 1 /* set current highest query level */
call INIT_NEW_QUERY_LEVEL_FIELDS

```

```

"alloc f(SYSOUT) DUMMY"
/* "call 'FDR.SYNCR36.LINKLIB(SYNCSORT)'" */
address ATTCHMVS "SORT"
/* use LRECL of first record */
if RC = 0 then
  do
    x = listdsi("LRECLCHK")
    LRECL = SYSLRECL
  end
else
  say '**WARNING** could not obtain LRECL info for ',
    'the data set 'LRECL_DSN
  "free f(SORTIN SORTOUT SYSIN SYSOUT)"
end
else
  do
    say '**ERROR** Problem obtaining LRECL info for 'LRECL_DSN
    say '    Cannot process without it. Processing terminated.'
    exit
  end
return

```

```

/***** C H A N G E   L O G *****/
/*  DATE      PGMR      DESCRIPTION      */
/*-----*/
/* [REDACTED] lcframe NOT IN added to WHERE verb options. */
/* [REDACTED] lcframe Cleanup of code, use full DD alias '.' in WHERE_TYPE. */
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/* [REDACTED] lcframe Upgrade product to handle VSAM and TAPE inputs and be */
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/* generally locate it on other JES complexes. */
/* [REDACTED] lcframe Make sure the output file is at least empty. No null */
/* outputs allowed. */
/* 06/06/01 lcframe Upgrade changes to allow for use of MIN, MAX, and */
/* COUNT functions as well as AND/OR logic in the WHERE verb. */
/* 2004/01/15 lcframe SORTWKxx files are no longer needed. SYNCSORT now */
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/*****

```

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